

Lab Report : 7

Problem name: *Implement a basic calculator application that supports addition, subtraction, multiplication, and division operations. Design the calculator system using abstract classes, interfaces, arithmetic operations, and exception handling to ensure flexibility and error handling.*

Code :

```
import java.util.Scanner;

abstract class Calculator{

    public abstract double Calculate(double a, double b, char operator);
}

interface Operatable{

    public boolean isValidOperator(char operator);
}

class BasicCalculator extends Calculator implements Operatable{

    @Override
    public boolean isValidOperator(char operator){

        if(operator == '+' || operator == '-' || operator == '*' || operator == '/'){
            return true;
        }
        else
            return false;
    }
}
```

```

@Override
public double Calculate(double a, double b, char operator){

    if(isValidOperator(operator)){

        switch(operator){

            case '+':
                return a+b;
            case '-':
                return a-b;
            case '*':
                return a*b;
            case '/':
                if(b==0){
                    throw new ArithmeticException("Error: Division by zero!");
                }
                return a/b;
            default:
                throw new ArithmeticException("Invalid operator!");
        }
    }
    else
        throw new ArithmeticException("Invalid operator!");

}

}

public class Problem {
public static void main(String [] args){

    BasicCalculator obj= new BasicCalculator();

    try{
        double result=obj.Calculate(55, 9, '+');
    }
}

```

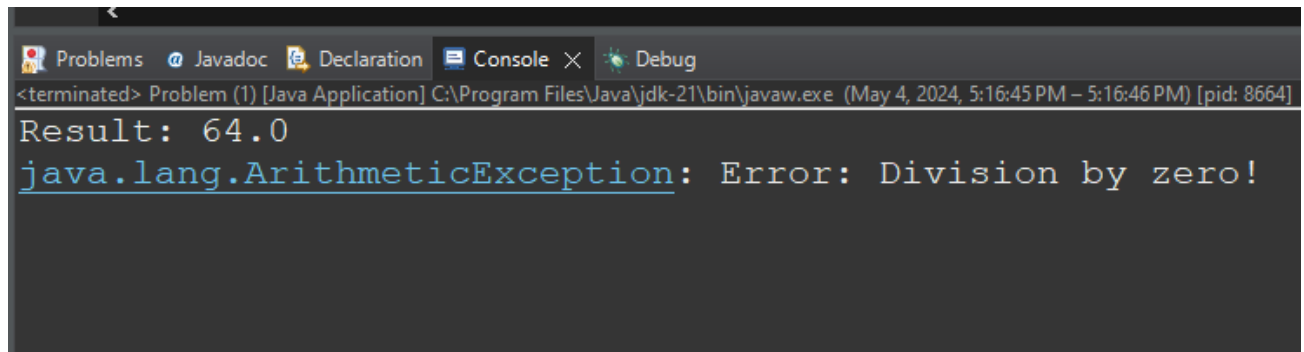
```
        System.out.println("Result: "+result);
    }catch(Exception d){System.out.println(d);};

    try{
        double result=obj.Calculate(32, 0, '/');
        System.out.println(result);
    }catch(Exception e){System.out.println(e);};

}

}
```

Output :



```
<terminated> Problem (1) [Java Application] C:\Program Files\Java\jdk-21\bin\javaw.exe (May 4, 2024, 5:16:45 PM – 5:16:46 PM) [pid: 8664]
Result: 64.0
java.lang.ArithmeticException: Error: Division by zero!
```